LAN' 7-2/cat

Manager, Lake Andes National Wildlife Refuge, Lake Andes, South Dakota

February 3, 1967

In reply refer to: RF

Assistant Regional Supervisor, Division of Wildlife Refuges, Minneapolis, Minnesota

Annual Water Program - 1967

Your program for managing waters on Lake Andes during 1967 is approved. Please review the attached comments by the Regional Engineer. We believe the thought that 1437.25 maximum may be difficult to maintain and difficult to live with politically is a good one. Therefore, we suggest that you aim for the 1436.75 maximum elevation as a more desirable level from all points of view.

Smith
2-3-67

Edward J. Smith

Attachment
EJSmith:mc 2-3-67

Carpenter
Martin
Smith
Stiles
A[illegible]er
B[illegible]y
C[illegible]er
Dill
Dundas
Harrison
Rollings
Winship
Woon

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Regional Supervisor, Division of Wildlife Refuges, Minneapolis

DATE: January 31, 1967

In reply refer to:
EH-R Lake Andes
Annual Water Program

FROM : Regional Engineer, Minneapolis

SUBJECT: 1967 Annual Water Program - Lake Andes

We have reviewed the 1967 program and concur in the proposed plan for 1967, subject to the following comments:

In the event enough water does enter the Lake Andes Units in 1967 to completely fill to elevation 1437.25, we should be careful not to exceed this elevation. In view of the touchy situation regarding Lake Andes water levels it would probably be more desirable to maintain a maximum level somewhat below that level, such as 1436.75.

We have checked the tabulation of inflow and outflow data submitted for 1966 and find that it appears to be computed correctly. We still believe a tabular summary showing this data would be helpful - as previously requested in our last year's comments. We have prepared a table based on the Manager's information to illustrate what we mean:

	A	B	C	D	E	F	G
North Unit	3.15	-1.68'	1.47	530	780	13	793
Center Unit	3.15	-1.46'	1.69	2000	3380	0	3380
South Unit	3.15	-0.66'	2.49	1635	4070	0	4070
Owens Bay	3.15	+.14	3.29	211	695	80	695
					8925	0*	8938

*Total 1966 outflow from the Refuge (South Unit) = 0 acre-feet.
Total 1966 inflow to the Refuge was 8938 acre-feet.
(The 8925 acre-feet figure is a check on computations in this instance as there was no outflow from the Refuge in 1966).

We are not certain as to what agreement is referred to in the last paragraph under recommendations. Apparently it involves the operation of the center unit by the State.

John D. Umberger

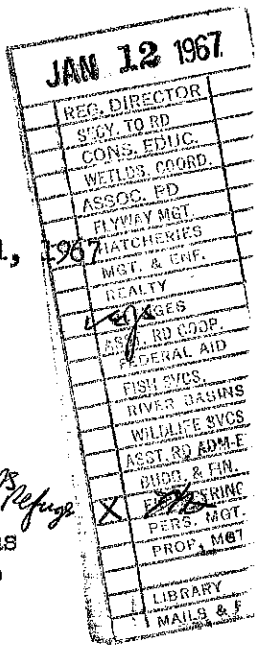
5010-106

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

R



TO : Regional Director, Minneapolis, Minn. DATE: January 11, 1967

FROM : Acting Refuge Manager, Lake Andes Refuge,
Lake Andes, South Dakota

SUBJECT: 1967 Water Program

Eugene: you may keep this for your file copy. EJS Refuge

The method outlined in "Computing Refuge Inflow", which I believe was distributed to Refuge Managers at a Regional Conference, was used to determine inflow.

The Area-Capacity Tables prepared by RO personnel were used to determine the acre feet of water lost during periods of outflow. Ninety percent of this loss is shown on the table as outflow. It is estimated that 10% was lost through evaporation. This method was also used to determine outflow for Owens Bay except 90% of the flow from the artesian well during the periods when water was released to the South Unit was added.

Fred R. Rusch, Jr.

Fred R. Rusch, Jr.

LAKE ANDES NATIONAL WILDLIFE REFUGE
Lake Andes, South Dakota

ANNUAL WATER PROGRAM - 1967

A. General Water Uses.

Lake Andes is divided into three units by two dikes. Each dike contains a control structure. An outlet structure is located on the southern most end of the lake. The maximum number of stop logs are maintained in these structures to hold water at the highest possible level in each unit.

Water flows from the North Unit to the Center Unit at elevation 1436.26. Water begins to flow between the Center and South Units at elevation 1434.85. Water begins to flow from the lake to the Missouri River through the outlet structure at elevation 1437.25.

Owens Bay is separated from Lake Andes proper by a dike which also contains a control structure. The water supply is mainly dependent on the flow of an artesian well. Water discharged from this unit flows into the South Unit.

B. 1966 Water Uses.

1. North Unit.

Approximately 13 acre feet of water flowed from the North Unit to the Center Unit during the period March 12 to May 15. Although levels were at the management level in mid-May, a net loss of 1.68 feet was recorded in 1966.

It is estimated that aquatic plant production increased approximately 50% over last year. Luxuriant stands of bulrush were present along the shorelines and across the northern portion of the unit.

Breeding pairs on this unit increased 14% over 1965. Seven broods were observed this year as compared to eight broods in 1965 for a 13% decline.

A commercial fisherman removed 65,500 pounds of bullheads. This is the first year bullheads were removed from this unit. On July 12 the South Dakota Department of Game, Fish and Parks stocked 15,000 fingerling large-mouth black bass in this unit.

2. Center Unit.

Although water levels increased gradually during the first four months of this year, a net loss of 1.46 feet was experienced.

It is estimated that the stands of pondweed increased approximately 50%. Waterfowl used these luxurious beds extensively during the spring and fall migrations. Stands of bulrushes were present along a major portion of the shoreline.

The peak waterfowl population of 18,500 coot, 6410 ducks, and 115 geese occurred on September 27. The waterfowl breeding population increased 85% over the 1965 population on this unit. The number of broods observed this year was 54% less than in 1965.

Personnel from Gavins Point Hatchery stocked 50,000 bass fingerlings in this unit on June 22. A fisheries check was conducted by the Division of Fishery Services on August 29-31. This check revealed that a heavy population of bullheads was still present and these fish were in good body condition. Northern pike were common but body condition is declining, perhaps due to the reduced number of forage species. A few large-mouth bass and perch were also netted.

The commercial fisherman removed 203,400 pounds of bullheads during 1966. A total of 519,800 pounds have been removed from the Center Unit since September 1, 1964.

The maximum depth of the unit is approximately six feet. Water levels and winter-kill conditions during early 1967 will determine if any stocking will be scheduled.

This unit was opened to dark house spearing on December 1.

3. South Unit.

Water last flowed through the outlet on April 13, 1963. Since that time water levels have receded. At the end of 1966 levels of the South Unit were 4.69 feet below the maximum management level of 1437.25. A net loss of .66 foot was experienced this year. Approximately 80 acre feet of water flowed into this unit from Owens Bay.

Pondweeds, primarily sago pondweed, increased 85% over last year's production. However, a heavy algae growth was present during the summer months which affected pondweed seed production.

For the first time since the lake filled in 1962, the water in this unit became clear. The reason for this change is unknown, especially since the remainder of the units of Lake Andes

proper remained very murky.

Breeding pairs decreased 8% from the 1965 counts and observed broods declined 8% on this unit. A peak of 41,100 coots and 8640 ducks was observed on September 27.

Fifty thousand fingerling bass were also stocked in this unit. Bass, bullheads, and fathead minnows were netted during the fishery check. These fish were in good condition. A total winter-kill is expected on this unit. The maximum depth is approximately six feet.

The commercial fisherman removed 119,900 pounds of bullheads from this unit in 1966. A total of 460,776 pounds have been removed to date.

This unit was also opened to dark house spearing during the period December 1, 1966, through March 5, 1967.

4. Owens Bay.

Higher water levels were maintained throughout the winter months to facilitate use of the duck trap during the 1966 post season banding operation. One, 12 inch stop log was removed on May 12 to expose additional shoreline during the summer months. The stop log was replaced on November 7 to again raise the levels for the 1967 banding program.

No reduction was noted in sago pondweed production. The entire water area was covered with thick stands throughout the summer months.

The first appreciable influx of mallards was noted on October 13. The buildup continued until 200,000 mallards were present in late December. The peak during the winter of 1965-66 was 100,000 birds. The peak Canada goose population of 4,000 was present from January through mid-March. The peak for the winter of 1966-67 is not expected until mid or late January.

The South Dakota Department of Game, Fish and Parks stocked this unit with 15,000 large-mouth bass fingerlings. The Bay is to be used as a hatchery under the provisions of an agreement between the Bureau and the State. The area was used as a hatchery prior to the complete winter-kill in 1965.

Approximately 20 adult bullfrogs, which were trapped at Lacreek Refuge, were released on this unit by refuge personnel.

C. Summary.

Precipitation during 1966 totalled 16.90 inches; 4.32 inches below

normal. Charles Mix County was declared a drought disaster area in early summer.

Although 980,576 pounds (490 tons) of bullheads have been removed from the Center and South Units, the bullhead population remains higher than desired. However, aquatic plant production increased indicating that the bullhead population had no adverse affect. Plans for game fish stocking in 1967 will not be developed until early February when water levels and winter-kill conditions are known. A total winter-kill is anticipated in the Center and South Units.

Although the water in the South Unit became clear during the past year, an algae growth developed which adversly affected pondweed seed production.

D. Recommendations for Management During 1967.

The level of each unit of Lake Andes proper will be maintained at the highest possible elevation. This will be accomplished by maintaining all stop logs in all structures. The maximum management level, 1437.25, will be maintained if adequate water is received. Otherwise, the optimum management levels of 1436.26 for the North Unit and 1434.85 for the Center and South Units will be maintained to the nearest extent possible.

Although the Long Range Water Management Plan specifies a drawdown from June 20 to September 15 in 1967, it is recommended that Owens Bay be managed as in the past two years. That is, hold levels at 1441.12 until mid-March, lower to 1440.12 throughout the summer months, and again raise the level to 1441.12 after June 15. The reason for the drawdown is to aerate the lake bed if a marked reduction in aquatics occurred. However, aquatic plant production has not decreased appreciably during the past two years. Also, the State stocked the area with bass fingerlings on July 12, 1966.

Because of the agreement with South Dakota and the periods of drought experienced during the past years, it is recommended that drawdown be determined on an annual basis rather than set on a long range schedule.

Fred R. Rusch, Jr.
Acting Refuge Manager

January 10, 1967

IMPOUNDMENT DATA - 1966

	North Unit			Center Unit		
	Average Elevation	Area (Acres)	Capacity (Acre Feet)	Average Elevation	Area (Acres)	Capacity (Acre Feet)
January	1435.46	532	1,660	1433.05	2050	8,500
February	1435.52	536	1,720	1433.07	2050	8,600
March	1436.14	564	2,040	1433.25	2060	8,900
April	1436.55	584	2,260	1433.31	2075	9,000
May	1436.37	576	2,140	1433.18	2050	8,800
June	1435.79	550	1,860	1432.67	2010	7,900
July	1435.32	528	1,600	1432.48	1990	7,400
August	1434.85	504	1,320	1432.29	1975	7,000
September	1434.55	488	1,180	1432.12	1950	6,600
October	1434.37	476	1,100	1432.01	1940	6,200
November	1434.18	460	1,010	1431.88	1925	6,100
December	1433.98	452	920	1431.59	1885	5,700
Inflow	~~896~~ 796 acre feet			3378 acre feet		
Outflow	13 acre feet			None		

	South Unit			Owens Bay Unit		
January	1433.22	1635	8,100	1440.80	225	470
February	1433.22	1635	8,100	1441.12	232	540
March	1433.57	1645	8,650	1441.01	230	510
April	1433.82	1655	9,100	1440.76	225	460
May	1433.68	1650	8,900	1440.88	227	480
June	1433.32	1640	8,200	1440.22	210	340
July	1432.88	1625	7,500	1440.07	205	310
August	1432.70	1620	7,200	1440.00	202	300
September	1432.52	1615	6,800	1440.09	205	310
October	1432.40	1610	6,700	1440.10	205	320
November	1432.49	1615	6,800	1440.25	212	340
December	1432.56	1620	7,000	1440.62	220	420
Inflow	4061 acre feet			707 acre feet		
Outflow	None			80 acre feet		